



# **NASA Procedural Requirements**

**NPR 7120.7A**

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**COMPLIANCE IS MANDATORY**

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## **NASA Information Technology Program and Project Management Requirements**

**Responsible Office: Office of the Chief Information Officer**

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# **Preface**

## **P.1 Purpose**

This document establishes the requirements by which NASA formulates and executes Information Technology (IT) programs and projects as prescribed in NPD 7120.4, NASA Engineering and Program/Project Management Policy, and consistent with NPD 1000.3, The NASA Organization.

## **P.2 Applicability**

a. This NASA Procedural Requirement (NPR) is applicable to NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers. This NPR applies to the Jet Propulsion Laboratory (JPL), a Federally-Funded Research and Development Center (FFRDC), other contractors, recipients of grants, cooperative agreements, or other agreements only to the extent specified or referenced in the applicable contracts, grants, or agreements.

b. This NPR applies to program and project management for all NASA IT programs and all IT projects within an IT program or within a non-IT program to ensure compliance with requirements and authority defined in NPD 7120.4. IT projects do not include IT incorporated within space flight, space technology, or aeronautics research projects. IT incorporated within space technology projects are governed by NPR 7120.5, NASA Space Flight Program and Project Management Requirements. IT incorporated within space flight research projects and aeronautics research projects are governed by NPR 7120.8, NASA Research and Technology Program and Project Management Requirements. The requirements of this NPR are considered to be the minimum requirements for all efforts within NASA IT programs and IT projects; however, more stringent requirements can be added for specific IT program or IT project efforts.

c. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms: “may” or “can” denote discretionary privilege or permission, “should” denotes a good practice and is recommended, but not required, “will” denotes expected outcome, and “are/is” denotes descriptive material.

d. In this directive, all document citations are assumed to be the latest version, unless otherwise noted.

## **P.3 Authorities**

a. NPD 2800.1, Managing Information Technology.

b. NPD 7120.4, NASA Engineering and Program/Project Management Policy.

## **P.4 Applicable Documents and Forms**

a. Information Technology Management (Clinger-Cohen Act of 1996), 40 U.S.C. § 11101 and § 11103.

b. Federal Information Security Modernization Act (FISMA) of 2014, 44 U.S.C. § 11319, et seq.

c. E-Government Act of 2002 (Public Law 107-347), 44 U.S.C. § 3601 et seq.

- d. Government Accountability Office (GAO) 18-148, Information Technology Reform: Agencies Need to Improve Certification of Incremental Development.
- e. Office of Management and Budget (OMB) M-15-14, Management and Oversight of Federal Information Technology, June 2015.
- f. National Institute of Standards and Technology (NIST) Special Publication 800-160, Systems Security Engineering, March 2018.
- g. NPD 1000.3, The NASA Organization.
- h. NPD 1000.5, Policy for NASA Acquisition.
- i. NPD 1200.1, NASA Internal Control.
- j. NPD 1210.2, NASA Surveys, Audits, and Reviews Policy.
- k. NPD 2800.1, Managing Information Technology.
- l. NPD 2810.1, NASA Information Security Policy.
- m. NPD 9250.1, Capital Asset Identification and Treatment.
- n. NPR 1382.1, NASA Privacy Procedural Requirements.
- o. NPD 1440.6, NASA Records Management.
- p. NPR 1441.1, NASA Records Management Program Requirements.
- q. NPR 2800.1, Managing Information Technology.
- r. NPR 2810.1, Security of Information Technology.
- s. NPR 2830.1, NASA Enterprise Architecture Procedures.
- t. NPR 7150.2, NASA Software Engineering Requirements.
- u. NPR 8000.4, Agency Risk Management Procedural Requirements.
- v. NASA Interim Directive (NID) 1417.102, NASA Paperwork Reduction Act (PRA) Compliance Program.
- w. NASA/SP-2014-3076, NASA Standing Review Board Handbook.
- x. NASA OCIO/SP-2020-0002, IT Program/Project Management Handbook.
- aa. NASA OCIO/SP-2018-0001, Office of the Chief Information Officer (OCIO) Risk Management Plan.
- bb. NASA Information Technology Strategic Plan (Fiscal Years 2018-2021).

## **P.5 Measurement Verification**

- a. The NASA Chief Information Officer (CIO) - Decision Authority (DA) verifies compliance with this NPR via internal and external controls consistent with processes defined in NPD 1200.1, NASA Internal Control. Internal and external controls include surveys, audits, reporting requirements, and reviews conducted in accordance with NPD 1210.2, NASA Surveys, Audits, and Reviews Policy.

- b. The Key Decision Points (KDPs) and project Systems Engineering (SE) reviews measure and verify that the programs and projects have submitted products and control plans due at the reviews.
- c. For IT programs in the Formulation Phase, the Program Manager documents compliance with this NPR by appending a completed Compliance Matrix (see Appendix C.1 and C.2) to the program Formulation Authorization Document (FAD) for KDP DA approval. If the Compliance Matrix requires changes after the FAD is approved, then an updated and approved Compliance Matrix will be attached to the Program Plan.
- d. For projects in the Pre-Formulation Phase, the Project Manager documents compliance with this NPR by appending a completed Compliance Matrix (see Appendix C.1 and C.3) to the IT project FAD for KDP DA approval. If the Compliance Matrix requires changes after the FAD is approved, then an updated and approved Compliance Matrix will be attached to the Project Plan.
- e. The Program Manager or Project Manager stores required documentation in a records repository accessible by the Agency OCIO.

## **P.6 Cancellation**

- a. NPR 7120.7, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements, dated November 3, 2008.
- b. NASA Interim Directive (NID) 7120.99, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements, dated December 22, 2011.

# **Chapter 1. Introduction**

## **1.1 Background**

- a. The NASA CIO provides leadership, planning, policy direction, and oversight for the management of all NASA IT in accordance with public law including: 40 U.S.C. § 11101 and § 11103, Clinger-Cohen Act, 44 U.S.C. § 3541, Federal Information Technology Acquisition Reform Act (FITARA), 44 U.S.C. 3601 et seq., E-Government Act, and 44 U.S.C. § 11319, et seq, the Federal Information Security Modernization Act of 2014 (FISMA). As such, the NASA CIO is the principal advisor to the NASA Administrator and other senior officials on matters pertaining to NASA's information and information systems, Enterprise Architecture (EA), cybersecurity, records management, and privacy.
- b. The NASA CIO manages NASA's information and information systems as a joint responsibility with the NASA Centers, mission directorates, and institutional offices. The NASA CIO directs, manages, and provides policy guidance and oversight of all NASA IT activities and operations.
- c. Because of the unique nature of Federal and Agency IT requirements, all NASA IT system development, implementation, and operation and maintenance will be integrated into a streamlined IT program and project life cycle. This NPR provides the procedural requirements that are necessary for the secure, risk-based, and cost-controlled program and project management of NASA IT resources.

## **1.2 IT Program and Project Evaluation**

- a. The performance of IT programs and IT projects is evaluated throughout the NASA IT life-cycle phases. Evaluation includes the continual, independent (i.e., outside the advocacy chain of the program or project) assessment and measurement of programs' and projects' performance to ensure planning and execution is aligned with approved plans.
- b. Evaluation will be compliant with Office of Management and Budget (OMB) guidance.

## Chapter 2. Program and Project Management Roles, Responsibilities, and Governance

### 2.1 IT Authority and IT Program Authority Roles and Responsibilities

- a. The roles and responsibilities for managing IT are defined in NPD 2800.1, Managing Information Technology, and NPR 2800.1, Managing Information Technology.
- b. IT Authority is the oversight, insight, policy compliance, information security, investment review, and architectural compliance for IT programs and projects.
- c. IT Program Authority is the management, oversight, implementation, and operations of IT services that are delivered by the NASA CIO or delegate.
- d. NASA categorizes IT Services as one of the following:
  - (1) Enterprise Services are provided to users across the entire Agency using a standard set of technologies and a single, Agency-wide service provisioning method.
  - (2) Center Standardized Services are not standardized and implemented at the Enterprise level, but are standardized by a Center for the users at that Center.
  - (3) Unique IT Services are implemented for a defined group of users at a level lower than the Enterprise or Center level (e.g., a department, mission directorate, mission program, IT program, project, or team).

#### 2.1.1 NASA CIO

- a. The NASA CIO is responsible and accountable for all IT investments, within IT programs and non-IT programs, and is required to fully implement Federal law, Federal regulations, and Agency directives.
- b. The NASA CIO is the DA for all IT programs and projects.
- c. The NASA CIO is ultimately responsible for ensuring that all NASA information systems operate at an acceptable level of security risk; therefore, the NASA CIO evaluates and approves the designation of all Authorizing Officials (AO) to all NASA information systems.
- d. The NASA CIO has IT Authority and IT Program Authority over all IT programs and associated projects. This authority is delegated as shown in Table A-1, IT Authority and IT Program Authority for NASA IT.

**Table A-1, IT Authority and IT Program Authority for NASA IT**

	<b>IT Authority</b>	<b>IT Program Authority</b>
<b>Enterprise Services</b>	IT Program Executive	IT Program Executive

<b>Center Standardized Services</b>	Center CIO	IT Program Executive
<b>Unique IT Services</b>	IT Program Executive	A representative that is not an IT Program Executive (e.g., Mission or other Non-IT organization)

### **2.1.2 Center CIO**

Center CIOs are responsible for providing effective implementation, operations, utilization, and evaluation of enterprise and Center standardized IT services that support the NASA IT Strategic Plan and align with the IT programs. Center CIOs ensure transparency into all IT at the Center, including Enterprise Services, Center Standardized Services, and Unique IT Services.

### **2.1.3 Program Executive**

The Program Executive (PE) ensures the program portfolio (including Enterprise and Center Standardized Services) is managed and optimized to meet current and future Agency needs and is vetted to enable sound business decisions and compliance with technical and architectural standards. The PE ensures that NASA IT users receive quality service.

### **2.1.4 Program Manager**

- a. The Program Manager is responsible for the implementation and execution of the program in compliance with the IT Program Life Cycle (Figure 1, IT Program Life Cycle).
- b. The Program Manager is responsible for achieving program goals/objectives, formulating and implementing the program's projects and initiatives, and ensuring that Operations and Maintenance (O&M) activities successfully meet operational/performance agreements.

### **2.1.5 Project Manager**

- a. The Project Manager is responsible for managing the project in accordance with the IT Project Life Cycle (Figure 2-1, IT Technology Development Pre-Formulation Life Cycle and Figure 2-2, IT Project Life Cycle).
- b. The Project Manager is responsible for ensuring the project is aligned to the program's objectives and contributes to the associated performance measures detailed in the Program Plan.

### **2.1.6 Initiative Lead**

- a. The Initiative Lead is responsible for execution of the initiative.
- b. The Initiative Lead is responsible for ensuring the initiative is aligned to the program's objectives and contributes to the associated performance measures detailed in the Program Plan.

### **2.1.7 Activity Lead**

- a. The Activity Lead is responsible for delivery of service within the activity.
- b. The Activity Lead is responsible for ensuring the activity is aligned to the program's objectives and contributes to the associated performance measures detailed in the Program Plan.



### 2.1.8 Program/Project Management Office

Program/Project Management Office(s) (PMOs) lead organizational changes, promote a project management culture, institutionalize organizational processes, manage projects, programs, portfolios, and improve the organization's overall performance.

## 2.2 IT Program and Project Management Governance

### 2.2.1 Program and Project KDP Reviews

a. Pursuant to the requirements detailed in NPD 1000.3, NASA and the NASA CIO establish IT governance by chartering boards with specific, independent oversight scope, and diverse stakeholder representation.

(1) These chartered boards inform the KDP DA for all NASA IT programs and projects.

(2) NASA's IT governance refers to the specification of decision rights, the accountability framework, and the processes by which programs effectively enable NASA to set and achieve its goals through the strategic use of IT.

b. The NASA CIO delegates the KDP DA for NASA IT project KDPs based on the criteria in Table A-2, Criteria for Program and Project KDP DA.

c. If a project has criteria that correlate to more than one level of DA, then the criteria tied to the highest level KDP DA will take precedence. An "X" in the table identifies the assignment of the KDP DA.

**Table A-2, Criteria for Program and Project KDP Decision Authority**

Criteria	NASA CIO	Program Executive	Center CIO
IT Programs	X		
Projects with DME cost $\geq$ \$1M or LCC $\geq$ \$5M	X		
Projects impacting more than one IT Program	X		
Projects with high visibility, impact, or risk	X		
Projects impacting more than one Center with minimal visibility and risk		X	
Projects impacting a single Center with minimal visibility and risk			X
Pre-Formulation KDP Reviews		X	

*Note: DME = Development, Modernization, and Enhancement, M = Million, and LCC = Life-Cycle Cost*

d. The KDP DA may request or require a project's KDP decision to be elevated even if the project does not meet the criteria for that higher KDP DA.

(1) Such a decision may be made, for example, for projects of high interest or importance to the Agency as a whole.

(2) In making this determination, the KDP DA will consult and coordinate with the program or Center that is sponsoring the project.

(3) In the event of a disagreement, the sponsoring program or Center may appeal the KDP DA determination to the NASA CIO.

### 2.2.2 Systems Engineering Reviews

a. The SE reviews evaluate the technical aspects of the project to ensure that the systems/subsystems engineering processes are functioning properly and are correctly applied as the project progresses from concept to product to closeout.

b. An SE Review Team (SERT) shall attend each SE review. The Project Manager identifies the SERT by completing the SERT Designation Form. The primary purpose of this team is to make a recommendation to the SE DA on whether the project should pass the SE review.

c. The NASA CIO delegates the SE DA for NASA IT project SE reviews, based on the criteria in Table A-3, Criteria for Project SE Decision Authority.

d. If a project has criteria that correlate to more than one level of SE DA, then the criteria tied to the highest-level SE DA will take precedence. An “X” in the table identifies the assignment of the SE DA.

**Table A-3, Criteria for Project SE Decision Authority**

Criteria	Agency PMO Lead	Program Manager	Center PMO Lead
Projects with DME cost $\geq$ \$1M or LCC $\geq$ \$5M	X		
Projects impacting more than one IT Program	X		
Projects with high visibility, impact, or risk	X		
Projects impacting more than one Center with minimal visibility and risk		X	
Projects impacting a single Center with minimal visibility and risk			X

*Note: DME = Development, Modernization, and Enhancement, M = Million, and LCC = Life-Cycle Cost, PMO = Program/Project Management Office*

e. The SE DA may request or require a project’s SE decision to be elevated even if the project does not meet the criteria for that higher DA.

## **Chapter 3. Requirements Common to Programs and Projects**

### **3.1 Program and Project Management Certification**

Program executives, Program Managers, and Project Managers shall manage Major IT Investments in accordance with OMB M-15-14, Management and Oversight of Federal Information Technology, and be certified in compliance with Office of Federal Procurement Policy (OFPP) December 16, 2013, Memo on Revisions to the Federal Acquisition Certification for Program and Project Managers (FAC-P/PM) within two years of position assignment.

### **3.2 Tailoring**

- a. Tailoring is the process used to scale the prescribed procedural requirements to meet the needs of a specific program or project. Tailoring is both an expected and accepted part of establishing proper procedural requirements for a program or project.
- b. Each program or project has unique aspects that may be accommodated through tailoring to achieve program/project success in an efficient and economical manner.
- c. The Program or Project Manager shall complete the following:
  - (1) Submit requests for tailoring of this NPR in the form of the Compliance Matrix (Appendix C) for approval by the KDP DA.
  - (2) Execute the program/project in accordance with the approved Compliance Matrix.
  - (3) Submit a waiver request if a requirement in the approved Compliance Matrix is violated.
- d. The KDP DA reviews and dispositions waivers.
- e. Tailoring does not apply to IT activities or initiatives.

### **3.3 Conducting Reviews**

- a. The Program or Project Manager shall complete the following tasks while conducting reviews:
  - (1) Conduct all required reviews as approved by the KDP DA in the Compliance Matrix.
  - (2) Meet the requirements of all reviews as approved in the Compliance Matrix, even if reviews are combined.
  - (3) Use OCIO standard templates or templates with content equivalent to the OCIO standard templates to ensure that requirements are met consistently during reviews.
  - (4) Ensure that a response has been made to each Review Item Discrepancy (RID) and Request for Action (RFA) from previous reviews or that a timely closure plan exists for any RIDs or RFAs remaining open.
  - (5) Create a Decision Memorandum to document results and decisions of all IT program and IT project reviews including actions. The SE DA approves the SE review decision memos and the KDP DA approves the KDP Review decision memos.

(6) Store required documentation, as documented in the Compliance Matrix, in a records repository accessible by the Agency OCIO prior to each review.

### **3.4 Enterprise Architecture**

To ensure IT programs, projects, initiatives, and activities are aligned to the Agency IT EA and transition plans, the Program or Project Manager shall ensure that all IT program, project, initiative, and activity teams operate in accordance with NPR 2830.1, NASA Enterprise Architecture Procedures, by providing the documentation listed in the Compliance Matrix (Appendix C).

### **3.5 IT System Security**

To ensure IT security across NASA meets confidentiality, integrity, and availability objectives for data and information including disaster recovery and continuity of operations for systems, the Program or Project Manager shall ensure that all IT program, project, initiative, and activity teams operate in accordance with NPD 2810.1, NASA Information Security Policy, and NPR 2810.1, Security of Information Technology, and in compliance with NIST Special Publication (SP) 800-160, Systems Security Engineering, by providing the documentation listed in the Compliance Matrix (Appendix C).

### **3.6 Records Management**

To comply with Federal law and build a history of NASA's decisions for future use, the Program or Project Manager shall ensure that all IT program, project, initiative, and activity teams operate in accordance with NPD 1440.6, NASA Records Management, and NPR 1441.1, NASA Records Management Program Requirements, by providing the documentation listed in the Compliance Matrix (Appendix C).

### **3.7 Privacy**

To maintain the privacy of personal information, the Project or Program Manager shall ensure that NASA IT program, project, initiative, and activity teams operate in accordance with NPR 1382.1, NASA Privacy Procedural Requirements, by providing the documentation listed in the Compliance Matrix (Appendix C).

### **3.8 Paperwork Reduction Act**

To comply with 44 U.S.C. § 3501, the Paperwork Reduction Act (PRA) of 1995, the Program or Project Manager shall conduct a PRA assessment for NASA IT systems/projects that involve the collection of information from individuals; educational and nonprofit institutions; Federal contractors; state, local, and tribal governments; and businesses in accordance with NID 1417.102, NASA Paperwork Reduction Act Compliance Program.

### **3.9 Risk Management**

The Program or Project Manager shall conduct risk analyses throughout all life-cycle phases and use the risk assessments to make risk-informed decisions in accordance with NPR 8000.4, Agency Risk Management Procedural Requirements, and NASA OCIO/SP-2018-0001, OCIO Risk Management Plan.

### **3.10 Capital Assets**

To identify, value, recognize, and report capitalized Property, Plant, and Equipment (PP&E), the Program or Project Manager shall identify capital assets and their costs in accordance with NPD 9250.1, Capital Asset Identification and Treatment.

### **3.11 Independent Assessment**

- a. An Independent Assessment (IA) is a review of a program, project, or activity that provides unbiased analysis of schedule, cost, technical risk, and performance.
- b. The IA Chair shall conduct the IA for programs prior to each program life-cycle phase transition and present results at each KDP Review.
- c. The IA Chair shall conduct the IA for projects prior to the Implementation Phase and present the results at the KDP-Implementation review.
- d. An IA for an activity may occur at any point during O&M at the discretion of the KDP DA for program KDP reviews.
- e. For information on the process of conducting an IA, reference the document NASA/SP-2014-3076, NASA Standing Review Board Handbook.

### **3.12 Termination Review**

- a. If the KDP DA is considering the termination of a program or project, then the KDP DA shall conduct a Termination Review. This review can be requested at any point in the life cycle.
- b. Circumstances such as the anticipated inability of the program or project to meet its commitments, an unanticipated change in the NASA IT strategic planning, or an unanticipated change in the NASA budget may trigger a Termination Review.
- c. The KDP DA may commission an IA prior to the Termination Review.
- d. The termination of a Technology Development (TD) can be requested by anyone at any point and is proposed as part of the KDP-TD Transition review.
- e. The termination of an initiative is at the discretion of the Program Manager, and no review is required.
- f. The termination of an activity is managed through the program's change control process.
- g. The Program or Project Manager shall provide the final Termination Review presentation.
- h. The KDP DA shall make a decision to continue or terminate the program or project.

### **3.13 Dissenting Opinions**

- a. If there is a dissenting opinion, then the Program Manager or Project Manager shall follow the Dissenting Opinion process in this section. NASA teams have full and open discussions, with all facts made available, to understand and assess issues. Diverse views are to be fostered and respected in an environment of integrity and trust with no suppression or retribution. In assessing a decision or action, an individual has three choices: agree, disagree but be willing to fully support the decision, or disagree and raise a Dissenting Opinion. To achieve resolution, unresolved issues of any nature should be quickly elevated at the next higher level of the involved authorities.

b. The decision on the dissent is documented and provided to the dissenter and becomes part of the program or project record. If the dissenter is not satisfied with the outcome, the dissenter may appeal to the next higher level of authority. The dissenter has the right to take the issue upward in the organization, even to the NASA Administrator, if necessary.

### **3.14 IT Program/Project Management Handbook**

Management of IT programs and projects is governed by a series of public regulations and NASA NPRs and NPDs. To assist Program and Project Managers, NASA OCIO/SP-2020-0002, IT Program/Project Management Handbook, provides details on how to implement this NPR.

## **Chapter 4. Program Management**

### **4.1 IT Program Components**

To support its diverse efforts, NASA invests in IT programs that deliver a complex set of IT developmental, enhancement, and operational services and capabilities. The IT programs manage IT investments through projects, initiatives, and activities.

#### **4.1.1 IT Project**

- a. An IT project is a specific investment having defined requirements, a life-cycle cost, a beginning, and an end. An IT project has a management structure and is planned, executed, and controlled according to a formal methodology and governed through a defined series of life-cycle reviews. An IT project may have interfaces to other projects, programs, agencies, and international partners. An IT project yields a new or revised system/service that directly addresses NASA's strategic goals.
- b. An IT project may have dependencies on other projects, initiatives, activities, and organizations.

#### **4.1.2 Initiative**

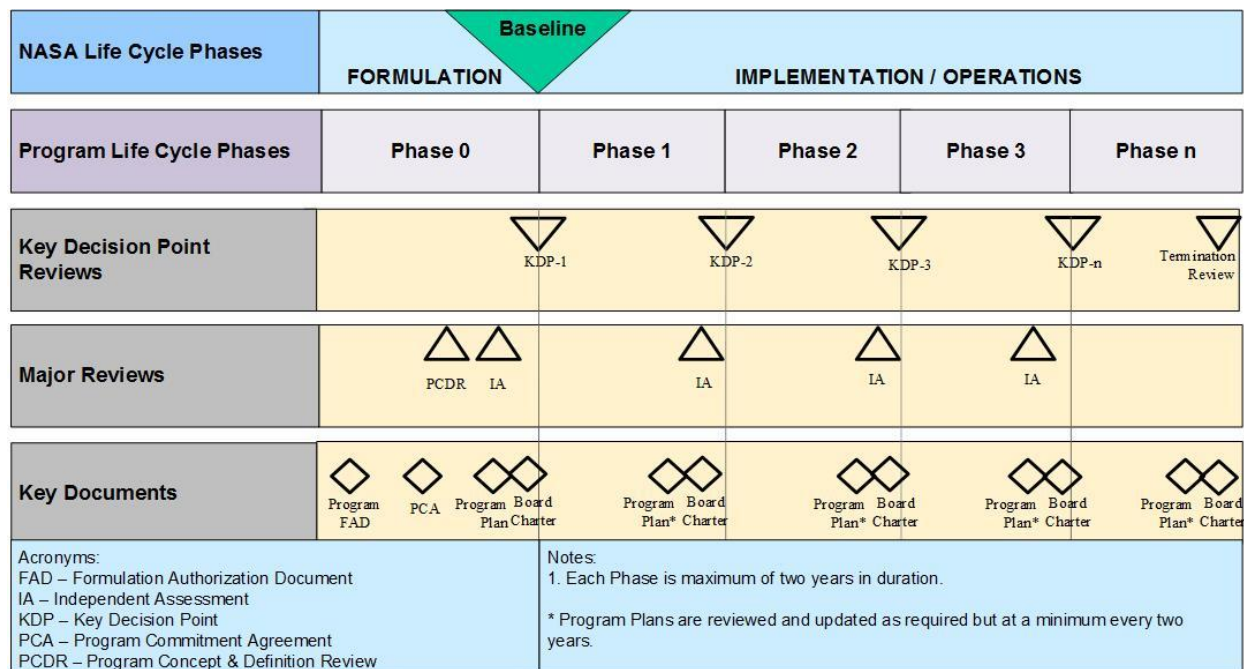
- a. An initiative is an effort intended to achieve stated objectives, such as improving performance, reducing costs, or analyzing capabilities. An initiative does not yield a new or revised system/service. Initiatives consume resources and may have associated cost. An initiative has a beginning date and end date, but has no required reviews.
- b. An initiative may have defined requirements, use cases, or user stories.
- c. An initiative may have dependencies on, and interfaces to, other initiatives, projects, activities, or organizations.
- d. The Program Manager will evaluate performance measures and monitor any dependencies, risks, and issues that may arise within an initiative.

#### **4.1.3 Activity**

- a. An activity is an ongoing and repetitive effort that operates, monitors, evaluates, and modifies existing IT systems/services. Activities consume resources and have a cost.
- b. The Program Manager will monitor and evaluate performance measures, dependencies, risks, and issues throughout the life of the activity.
- c. If a Program Manager requires an operational system/asset to be decommissioned, then the Program Manager shall establish a project to manage the decommissioning effort.
- d. Modifications within an activity are reviewed and approved through a change control process.

### **4.2 Program Management Approach**

- a. Organizations within NASA manage requirements, schedules, and budgets according to a program management structure. NASA uses IT programs to manage the implementation of the NASA IT Strategic Plan.
- b. Each Program Manager shall follow the IT program life-cycle shown in Figure 1, IT Program Life-Cycle.



**Figure 1, IT Program Life-Cycle**

### 4.3 Program Baseline

- a. The program baseline is an agreed-to set of requirements, costs, and schedules with controlled changes occurring through a formal approval and monitoring process.
- b. The program baseline spans a minimum of two years and is documented in the Program Plan.
- c. The KDP DA shall determine if the initial program baseline at the KDP-1 is approved.
- d. Changes to the initial program baseline are presented at future KDPs (i.e. KDP-2, KDP-n) and become the “current” program baseline.
- e. The program’s performance is measured against the program baseline during the Implementation/Operations Phase.

#### 4.3.1 Program Rebaseline

- a. A program rebaseline changes requirements, schedule, budget, or any combination of these factors.
- b. A Program Manager shall rebaseline when one or any combination of the following exists:
- (1) Addition, change, or deletion of investment goals (requirements, objectives) resulting from internal or external management decisions.



- (2) Changes in program funding level or availability of funds (e.g., extended continuing resolution).
  - (3) Changes in contracting (including bid protests).
  - (4) The current baseline is no longer useful as a management tool for realistic performance measurement (cost, schedule, or requirements) as variances have exceeded the approved limits.
  - (5) The program has been interrupted or put on hold.
  - (6) The KDP DA requests a rebaseline.
- c. The Program Manager shall present a rebaseline proposal to the KDP DA during a program KDP Review.
  - d. If the outcome of the KDP Review is to terminate the program, then refer to section 3.12 Termination Review.
  - e. The Program Manager shall update the Program Plan to reflect the approved cost, schedule, and scope.

#### **4.3.2 Program Replan**

- a. Changes that do not alter the program's baseline may be executed as a replan and require the approval of the PE.
- b. Any one or combination of the following situations would invoke a replan:
  - (1) Editorial changes to investment goals.
  - (2) Additional program details are realized that do not affect the baseline.
  - (3) A program's project, initiative, or activity has been interrupted or put on hold.
  - (4) The program executive requests a replan.
- c. The Program Manager shall update the Program Plan to reflect replanned elements.

#### **4.4 Program Life-Cycle Phases**

- a. All IT programs have a NASA life cycle that is divided into two phases: Formulation and Implementation/Operations, as depicted in Figure 1, IT Program Life Cycle.
  - (1) Program Formulation Phase identifies how the program will support and align with the NASA Information Technology Strategic Plan; develops the Program Plan, including resources, budget, and schedule; and identifies the evaluation strategies used to monitor program performance.
  - (2) Program Implementation/Operations is execution of the approved program and the use of controls to ensure performance and continued alignment with the NASA Information Technology Strategic Plan.
- b. The Implementation/Operations Phase is further separated into program life-cycle phases (1, 2, 3, etc.). The number of phases is dependent on the duration of the program.
- c. The transition from one phase to another phase is approved by the subsequent KDP review (i.e. KDP-1, KDP-2...KDP-n).

d. Program KDP reviews provide an opportunity to organize, assess, and communicate critical data and information among the program and the customers and stakeholders. Program KDP reviews provide an opportunity to improve program performance by inviting independent experts to provide an evaluation of the approach.

(1) The KDP DA and the Program Manager shall convene program KDP reviews at a minimum of every two years.

(2) The Program Manager shall document the results of the KDP reviews in the Program Plan.

#### **4.4.1 Program Formulation**

a. The PE shall prepare:

(1) The Program FAD that authorizes the Program Manager to initiate the planning of a new program and to perform the analyses required to formulate a sound Program Commitment Agreement (PCA). The NASA CIO shall determine if the Program FAD is approved.

(2) The PCA that is an agreement between the NASA CIO and the cognizant PE and program manager for instantiation of a program. The NASA CIO shall determine if the PCA is approved.

b. The Program Manager, with oversight by the PE, shall prepare:

(1) The initial Program Plan that contains the details of the agreement approved in the PCA and establishes the program's baseline for Implementation/Operations. The NASA CIO shall determine if the Program Plan is approved.

(2) The Program Board Charter that formally establishes the program board and sets forth its authority, responsibilities, membership, and general operating procedures. The program board assists the program in supporting NASA's IT requirements for: providing consistent service and performance; facilitating collaboration across the Agency; and maintaining the confidentiality, integrity, and availability of NASA's IT resources. The PE shall determine if the Program Board Charter is approved.

c. Program Managers shall complete the Program Concept and Definition Review (PCDR) to show that the program is in place and stable, addresses critical NASA needs, has adequately completed formulation activities, and has an acceptable plan for Implementation/Operations. The PCDR only occurs once in the life-cycle of an IT program, during Formulation.

d. During the program Formulation Phase, the Program Manager shall meet the following PCDR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

(1) Final Program FAD.

(2) Final PCA.

(3) Preliminary Program Plan.

(4) Preliminary Compliance Matrix.

(5) Final PCDR presentation charts.

e. The KDP DA shall make a decision on the readiness to proceed to KDP-1.

f. The IA evaluates the proposed baseline presented in the Program Plan.

(1) The IA Chair shall evaluate:

(a) The program's relevancy to the NASA Information Technology Strategic Plan goals/objectives.

(b) Schedule.

(c) Cost estimates.

(d) Risk assessment and mitigation plans.

(2) The IA Chair shall present the findings in a final IA presentation at KDP-1.

g. The program KDP is a business review of the program's performance to determine if the program can proceed to the next life-cycle phase. KDP-1 transitions the program from Formulation to Implementation/Operations and baselines the program.

(1) At the end of the Formulation Phase, the Program Manager shall meet the following KDP-1 success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

(a) Final Program Plan.

(b) Final Compliance Matrix.

(c) Final KDP-1 presentation charts.

(d) Final Program Board Charter.

(2) The KDP DA shall make a decision on the readiness to proceed to the Implementation/Operations Phase.

#### **4.4.2 Program Implementation/Operations**

a. During program Implementation/Operations, the program provides NASA with IT developmental, enhancement, and operational capabilities managed through projects, initiatives, and activities. The effectiveness of each program is evaluated throughout its life cycle utilizing major program reviews.

b. During program Implementation/Operations, the Program Manager shall:

(1) Execute the Program Plan and maintain change log.

(2) Monitor and evaluate performance measures, dependencies, risks, and issues throughout the life of the projects, initiatives, and activities.

c. During Implementation/Operations, the IA examines the program's continuing relevance to the NASA IT Strategic Plan, the progress to date against the approved baseline, and the updated Program Plan.

d. The IA Chair shall evaluate the following:

(1) The program's relevancy to the NASA Information Technology Strategic Plan goals/objectives.

(2) The program's progress alignment to the approved baseline.

(3) The implementation of handling strategies for risks to manage impacts.

(4) The program components, as detailed in the Program Plan, including technical and management approach, performance measures, schedules, cost estimates, and risk assessments.

e. The IA Chair shall present the findings in a final IA presentation at KDP-2-n.

f. KDP-2 and subsequent KDPs approve continued implementation/operations of the program and establish a new baseline.

g. The Program Manager shall meet the following KDP-2-n success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

(1) Updated Program Plan.

(2) Updated Compliance Matrix.

(3) Updated Program Board Charter.

(4) Final KDP-2-n presentation charts.

h. The KDP DA shall make a decision on the readiness to proceed to the next program life-cycle phase or terminate the program. If the KDP DA determines the program should terminate, then the program follows the Termination Review criteria in section 3.12.

## **Chapter 5. Project Management**

### **5.1 Project Management and Methodology Approach**

a. In alignment with the Program Plan, IT projects provide services and capabilities to meet the program's objectives.

b. The project may include IT TD in the form of a Proof of Concept (PoC) or Prototype. IT TD matures a particular technology or set of related technologies and is managed within the project life-cycle (Pre-Formulation), to the point where it is ready to transition to the IT project Formulation Phase.

(1) A PoC is an analytical and experimental demonstration of hardware or software concepts that may or may not be incorporated into subsequent development or operational systems. To be deliberate, the PoC should clearly state what is to be proven and to what degree. Characteristically, a PoC relates to parts of a complete system utilizing a test environment.

(2) A prototype is used to test the viability or usefulness of a system or subsystem and demonstrates the technology in a way that the customer or beneficiary can visualize the experience of using the technology or system. It is intended to identify, demonstrate, and evaluate the key management, policy, technology, and cost implications of a desired system. A prototype is intended for a fixed and limited duration to capture lessons or knowledge for possible implementation. It operates within a test environment and is not a full-feature system.

c. The project may include a pilot implemented during the Operations Phase. A pilot is a full-feature system deployed into the production environment as an experimental trial to a limited user base, with all relevant IT system security controls in place, including an Authorization to Operate (ATO).

### **5.2 Software Engineering and Incremental Development**

a. To ensure effective and efficient software development, Project Managers shall ensure software acquisition, development, maintenance, retirement, operations, and software created, acquired, or maintained is in accordance with NPR 7150.2, NASA Software Engineering Requirements.

b. 44 U.S.C. § 3541 (FITARA) requires the NASA CIO to certify that IT investments are adequately implementing incremental development as defined in capital planning guidance issued by OMB.

(1) Incremental or modular development is where an investment may be partitioned into discrete projects, increments, or useful segments, each of which is undertaken to develop and implement the products and capabilities that the larger investment will deliver.

(2) Dividing investments into smaller projects helps to reduce investment risk, deliver capabilities more rapidly, and permit easier adoption of newer and emerging technologies, as referenced in Government Accountability Office (GAO)-18-148, Information Technology Reform, Agencies Need to Improve Certification of Incremental Development.

c. For all projects in which software is being developed, the Project Manager shall ensure that planned and actual delivery of new or modified technical functionality to users occurs at least every six months in accordance with OMB-15-14.

d. Certification of incremental development applies to any project that is developing software.

*NOTE: Incremental development and the certification thereof is not applicable for investments and projects where software development is not occurring, such as an investment related to infrastructure or technology refreshment of equipment.*

e. The KDP DA shall certify that incremental development has been addressed and documented in the project FAD.

### **5.3 Project Baseline**

a. The term project baseline is defined as a set of requirements, cost, and schedule controlled through a formal approval and monitoring process and is documented in the Project Plan.

b. The KDP DA shall determine if the initial project baseline at KDP-Implementation is approved.

c. The project baseline can be updated after KDP-Implementation if approved by the KDP DA.

d. The project's performance is measured against the approved baseline during the Implementation Phase.

#### **5.3.1 Project Rebaseline**

a. A rebaseline changes requirements, schedule, budget, or a combination of all three factors.

b. Project teams shall rebaseline if any one or more of the criteria are met:

(1) There is a significant change in investment goals (requirements, objectives) resulting from internal or external management decisions, changes in funding level or availability of funds (e.g., extended continuing resolution), or contracting (including contractual protests).

(2) The current baseline is no longer useful as a management tool for realistic performance measurement (cost, schedule, or requirements) as variances have exceeded the approved limits.

(3) The project has been interrupted.

(4) The KDP DA requests a rebaseline.

c. The Project Manager shall present a rebaselining proposal to the KDP DA during a KDP review or as a rebaseline review separate from a KDP.

d. The Project Manager shall document the results of the KDP or rebaseline review in a Project KDP Decision Memorandum and update the Project Plan.

e. If the recommendation is to terminate the project, then refer to the Termination Review section, 3.12.

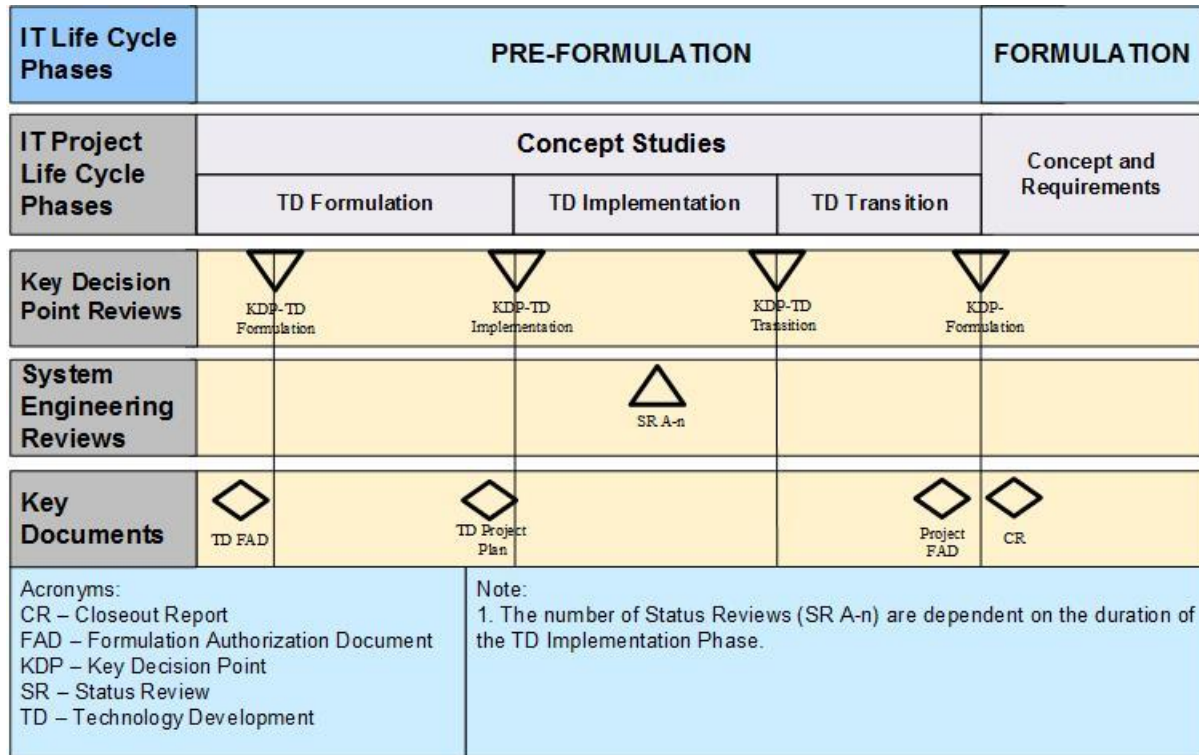
#### **5.3.2 Project Replan**

a. Changes that do not alter the project's baseline may be executed as a replan under the authority of the Program Manager.

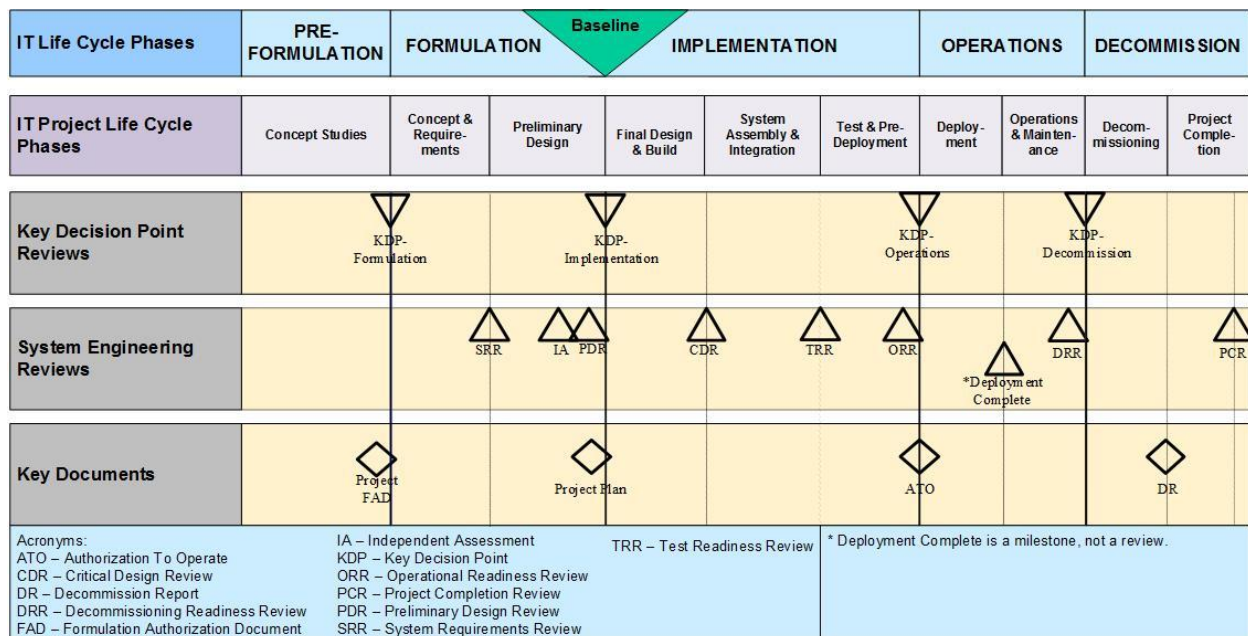
b. The Project Manager shall document the results of the replan in the Project Plan.

## 5.4 IT Life-Cycle Phases

- a. All IT projects have an IT life-cycle that is divided into phases: Pre-Formulation, Formulation, Implementation, Operations, and Decommission.
- b. The transition from one IT life-cycle phase to another is approved by a KDP review. Additionally, projects with TD use KDPs to transition from one TD phase to another depicted in Figure 2-1, IT Technology Development Pre-Formulation Life Cycle.



**Figure 2-1, IT Technology Development Pre-Formulation Life Cycle**



**Figure 2-2, IT Project Life Cycle**

- c. The IT life-cycle phases are separated into incremental project life-cycle phases.
- d. The transition from one project life-cycle phase to another is approved by a specific SE review per the FAD and Project Plan depicted in Figure 2-2, IT Project Life Cycle.
- e. Each Project Manager shall follow the IT project life-cycle depicted in Figures 2-1 and 2-2, including preparation of, and obtaining approval of key documents:
  - (1) Project FAD.
  - (2) Project Plan.
  - (3) ATO.
  - (4) Decommissioning Report (DR).
- f. The IT project life-cycle is tailorable to support all system/service development methodologies.
  - (1) The phasing of project deliverables may vary based on the chosen system development methodology (e.g., Waterfall, Iterative, Agile).
  - (2) The Project Manager shall present the proposed system development methodology in the FAD to be approved by the KDP DA and in the Project Plan to be approved by the KDP DA during KDP-Implementation.

#### 5.4.1 Pre-Formulation Phase

The IT Pre-Formulation Phase consists of the Concept Studies project life-cycle phase.

##### 5.4.1.1 Concept Studies

- a. During the Concept Studies Phase, a project team considers a broad range of system/service-enabling concepts that align to the program objectives and result in a project FAD. Historical information and interactions with customers and other potential stakeholders, help to identify a



preliminary concept, draft project-level user requirements, technical requirements, and needed technologies.

b. If TD is included in the project, then Concept Studies is further segmented into TD Formulation Phase, TD Implementation Phase, and TD Transition Phase, as depicted in Figure 2-1, IT Technology Development Pre-Formulation Life Cycle.

#### **5.4.1.1.1 TD Formulation**

a. KDP-TD Formulation (TDF) is a point in time when the KDP DA makes a decision on the readiness of the project, to progress to the TD Formulation Phase.

b. The Project Manager shall meet the following KDP-TDF success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

(1) Final TD FAD.

(2) Final Compliance Matrix.

(3) Final KDP-TDF presentation charts.

(4) Preliminary TD Project Plan.

c. The KDP DA shall make a decision on the readiness to transition to the TD Formulation Phase and approval of the TD FAD.

d. KDP-TD Implementation (TDI) is a point in time when the KDP DA makes a decision on the readiness of the project to progress to the TD Implementation Phase.

e. The Project Manager shall meet the following KDP-TDI success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

(1) Final TD Project Plan.

(2) Final KDP-TDI presentation charts.

(3) Updated Compliance Matrix.

f. The KDP DA shall make a decision on the readiness to transition to the TD Implementation Phase and approval of the TD Project Plan.

#### **5.4.1.1.2 TD Implementation**

a. During the TD Implementation Phase the Project Manager executes the Project Plan and should provide information briefings to the TD stakeholders at the periodic Status Reviews (SRs). The SR briefings include status on schedule, cost, issues, risks, and dependencies. The SR provides recommendations to the project for forward work and helps the project to escalate any risks or issues.

b. The Project Manager shall file the final SR presentation charts in the records repository accessible by the Agency OCIO.

c. KDP-TD Transition (TDT) is a point in time when the KDP DA makes a decision on the readiness of the project to progress to the TD Transition Phase where the project will either closeout or continue.

d. The Project Manager shall meet the following KDP-TDT success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Final TD Project Plan.
  - (2) Final KDP-TDT presentation charts.
  - (3) Final TD Business Case if recommending the project continue.
  - (4) Update Compliance Matrix.
- e. The KDP DA shall make a decision on the readiness to proceed to the TD Transition Phase and whether the project will continue or closeout.

#### **5.4.1.1.3 TD Transition**

a. During the TD Transition Phase:

- (1) If approved to continue, then the Project Manager shall develop a project FAD and Compliance Matrix, for review at KDP-Formulation.
- (2) If not approved to continue, then the Project Manager shall:
  - (a) Submit a final Closeout Report (CR).
  - (b) Shutdown any PoC or prototypes.

#### **5.4.1.2 KDP-Formulation**

- a. Pre-Formulation culminates in KDP-Formulation when the KDP DA authorizes a Project Manager to perform the analysis required to formulate a sound Project Plan that captures Pre-Formulation results.
- b. To effect a project's entry into the Formulation Phase, the Project Manager shall meet the following KDP-Formulation success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:
- (1) Final Project FAD.
  - (2) Final Compliance Matrix.
  - (3) Final KDP-Formulation presentation.
  - (4) Final SERT Designation Form.
- c. The KDP DA shall make a decision on the readiness to begin the Formulation Phase.

#### **5.4.2 Formulation**

- a. Formulation Phase consists of two project life-cycle phases: Concept & Requirements and Preliminary Design.
- b. In Formulation, the Project Manager executes the FAD, developing the Project Plan, budgets, schedules, preliminary design, and management controls to ensure project performance and alignment to the program's strategic objectives.

##### **5.4.2.1 Concept & Requirements**

- a. During the Concept & Requirements Phase, the project team, with assistance from stakeholders, develops a preliminary Analysis of Alternatives (AoA), Concept of Operations (ConOps), and the project's preliminary top-level user and technical requirements. These activities take place in preparation for the System Requirements Review (SRR).

b. The SRR is conducted to examine the functional, technical, performance, and IT security requirements for the system, ensuring the requirements with the selected concept will satisfy the project objectives.

c. The Project Manager shall meet the following SRR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Final Requirements Specification (RS).
- (2) The preliminary Requirements Traceability Matrix (RTM).
- (3) Final SRR presentation charts.
- (4) Final Enterprise Architecture Project Assessment (EAPA).
- (5) Preliminary Project Plan.
- (6) Preliminary IT System Security Plan.
- (7) Preliminary Software Development Plan/Software Management Plan.
- (8) Preliminary ConOps.
- (9) Preliminary AoA.

d. The SE DA shall make a decision on the readiness to begin the Preliminary Design Phase.

#### **5.4.2.2 Preliminary Design**

a. During the Preliminary Design Phase, the project team is focused towards being able to baseline the requirements, cost, and schedule, and to establish a preliminary design, implementation approach, and test plan. These efforts take place in preparation for the Preliminary Design Review (PDR).

b. The IA evaluates the proposed baseline presented in the Project Plan.

c. The IA Chair shall evaluate the following:

- (1) The project's relevancy to the program goals/objectives.
- (2) Schedule.
- (3) Cost estimates.
- (4) Risk assessment and mitigation plans.

d. During the Preliminary Design Phase, the project team shall support the IA team review analysis.

e. The PDR demonstrates that the preliminary design meets all system requirements with acceptable risk and within the cost and schedule constraints and establishes the basis for proceeding with detailed design. The interfaces have been identified, test plans are in development, and plans to update standard operating plans/procedures have been described.

f. The Project Manager shall meet the following PDR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Final AoA.
- (2) Preliminary Design Specification (DS).

- (3) Updated RTM.
- (4) Preliminary Interface Control Document (ICD)(s).
- (5) Final Acquisition Plan.
- (6) Updated Software Development/Management Plan.
- (7) Updated Project Plan.
- (8) Updated IT System Security Plan.
- (9) Updated ConOps.
- (10) Preliminary Operations Concept (OpsCon).
- (11) Preliminary Test Plan.
- (12) Preliminary Security Control Assessment.
- (13) Final PDR presentation charts.

g. The SE DA shall make a decision on the readiness to proceed to KDP-Implementation.

#### **5.4.2.3 KDP-Implementation**

a. Formulation culminates in KDP-Implementation when the KDP DA makes a decision on the readiness of a project to progress to the Implementation Phase.

- (1) The Project Manager presents a summary of the completion of Formulation Phase including the Concept & Requirements and Preliminary Design deliverables.
- (2) The results of the IA provide an analysis of the project's readiness to advance to the Implementation Phase.
- (3) The approved requirements, schedule, and budget become the baseline.

b. The Project Manager shall meet the following KDP-Implementation success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Final KDP-Implementation presentation charts.
- (2) Updated Project Plan.

c. The IA Chair shall present the IA findings and recommendations at KDP-Implementation.

d. The KDP DA shall make a decision on the readiness to begin the Implementation Phase.

#### **5.4.3 Implementation**

a. Implementation Phase consists of three IT project life-cycle phases: Final Design & Build; System Assembly & Integration; and Test & Pre-Deployment Phases.

b. Implementation Phase includes the continued development and execution of approved plans and the evaluation of the project performance using management controls.

##### **5.4.3.1 Final Design & Build**

a. During the Final Design & Build Phase, the project team completes the final design providing traceability to the detailed requirements, begins early production of system components requiring

long-lead time, and completes acquisitions. These efforts take place in preparation for the Critical Design Review (CDR).

b. The CDR confirms that the maturity of the design is acceptable to proceed with assembly and integration. The CDR determines that the technical effort is on track to complete the system development, meets performance requirements, validates system architecture, and reviews the IT system security design including IT system security controls.

c. The Project Manager shall meet the following CDR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Final DS.
- (2) Updated RTM.
- (3) Updated Project Plan.
- (4) Updated ICD(s).
- (5) Updated Test Plan.
- (6) Preliminary Test Cases and Procedures.
- (7) Preliminary O&M sustainment commitments.
- (8) Preliminary O&M Handbook.
- (9) Final Software Development/Management Plan.
- (10) Preliminary Project Training Plan and materials.
- (11) Updated IT System Security Plan.
- (12) Final ConOps.
- (13) Updated OpsCon.
- (14) Final Security Control Assessment.
- (15) Final CDR presentation charts.

d. The Project Manager shall validate that acquisitions are executed.

e. The SE DA shall make a decision on the readiness to begin the System Assembly & Integration Phase.

#### **5.4.3.2 System Assembly & Integration**

a. During System Assembly & Integration, the project acquires, builds, configures, and integrates the system/service.

- (1) The various hardware and software components and sub-systems are integrated to verify the design.
- (2) These efforts take place in preparation for the Test Readiness Review (TRR).

b. The TRR evaluates the project's readiness to proceed with formal testing per the test plan confirming that adequate schedule, resources, and management processes are in place.

- (1) The test plan demonstrates the traceability of test cases/scenarios to requirements and design (verification) and describes user acceptance testing (validation).

(2) If testing is going to be conducted in the production environment, then an IT System Security Plan is in place and the system ATO has been signed by the AO.

c. The Project Manager shall meet the following TRR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Final Test Plan.
- (2) Final RTM.
- (3) Final Project Training Plan and materials.
- (4) Updated O&M Handbook.
- (5) Updated Project Plan.
- (6) Final Security Assessment Report (SAR).
- (7) Preliminary Authorization Package.
- (8) Updated OpsCon.
- (9) Final ATO if testing in the production environment.
- (10) Final TRR presentation chart.

d. The Project Manager shall validate that subsystem and system integration and testing is complete and the test results are satisfactory for proceeding into formal verification and validation.

e. The SE DA shall make a decision on the readiness to begin the Test & Pre-Deployment Phase.

#### **5.4.3.3 Test & Pre-Deployment**

a. During Test & Pre-Deployment, the system/service undergoes rigorous verification and validation as written in the test plan to ensure the implemented system/processes meet requirements, design intentions, and user expectations. The testing efforts take place in preparation for Operational Readiness Review (ORR).

b. The ORR evaluates the project's preparedness to deploy the system/service. The ORR demonstrates that: the requirements have been met; the functionality, performance, and IT system security controls have been thoroughly tested; procedures are in place for O&M activity; and the organization responsible for operations/sustaining engineering is ready to assume responsibility.

c. The Project Manager shall meet the following ORR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

- (1) Updated Project Plan.
- (2) Final O&M sustainment commitments.
- (3) Final Deployment Plan.
- (4) Final OpsCon.
- (5) Final O&M Handbook.
- (6) Final ATO has been submitted for signature or is signed.

(7) Final IT System Security Plan.

(8) Final ORR presentation charts.

d. The SE DA shall make a decision on the readiness to proceed to KDP-Operations.

#### **5.4.3.4 KDP-Operations**

a. Implementation culminates in KDP-Operations when the KDP DA makes a decision on the readiness of a project to begin Operations Phase.

(1) A system/service where the plan includes executing pilots can only be deployed with KDP-Operations approval.

(2) The Project Manager presents a summary on completion of the Implementation Phase including final design and architecture, system testing, operational support readiness, system authorization, training, and O&M funding sources.

b. The Project Manager shall meet the following KDP-Operations success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:

(1) Final KDP-Operations presentation charts.

(2) Final ATO.

c. The KDP DA shall make a decision on the readiness to begin Operations Phase.

#### **5.4.4 Operations**

a. IT Operations Phase consists of two IT project life-cycle phases: Deployment and Operations & Maintenance.

b. IT Operations Phase includes sustainment and evaluation of the system/service.

##### **5.4.4.1 Deployment**

a. During the Deployment Phase, the system/service is deployed into the operational environment.

(1) The Deployment Phase recognizes the transition of responsibility from the project team to an operations/sustaining engineering team, including lessons learned and transition support to the Help Desk.

(2) At the conclusion of the Deployment, the system/service is considered fully operational.

b. The plan to deploy may include a pilot.

(1) If the KDP DA determines the pilot deployment is successful, then the system may be deployed to full production for all intended users as authorized at KDP-Operations.

(2) If not able to successfully implement the approved pilot deployment, then the Project Manager shall present a revised plan to deploy to the KDP DA for approval.

c. The Project Manager shall validate the deployment efforts are complete at the Deployment Complete milestone. This serves as the transition to the Operations & Maintenance Phase.

#### **5.4.4.2 Operations & Maintenance**

- a. During the Operations & Maintenance Phase, the responsibility for the ongoing sustainment of the new or revised system/service is transitioned from the Project Manager to an activity lead and managed as an activity.
- b. If a project includes decommissioning an operational system/service, a Project Manager presents the recommendation to begin decommissioning at a Decommissioning Readiness Review (DRR). The DRR confirms the decision and assesses the readiness of the system components for the safe decommissioning and disposal of system assets.
- c. The Project Manager shall meet the following DRR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:
  - (1) Updated ICD.
  - (2) Final Decommissioning Plan.
  - (3) Final DRR presentation charts.
- d. The SE DA shall make a decision on the readiness to proceed to KDP-Decommission.

#### **5.4.4.3 KDP-Decommission**

- a. Operations culminates in KDP-Decommission when the KDP DA makes a decision on the readiness of a project to begin Decommission Phase.
  - (1) The Project Manager presents a summary of the Decommissioning Plan including requirements, security concerns, schedule, cost, and stakeholder coordination.
- b. The Project Manager shall meet the following KDP-Decommission success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:
  - (1) Final KDP-Decommission presentation charts.
- c. The KDP DA shall make a decision on the readiness to begin the Decommission Phase.

#### **5.4.5 Decommission**

Decommission Phase consists of the Decommissioning and Project Completion project life-cycle phases.

##### **5.4.5.1 Decommissioning**

- a. During the Decommissioning Phase, legacy systems/services are safely decommissioned and the disposal of system/service assets is completed per the Decommissioning Plan.
- b. The Project Manager shall:
  - (1) Execute the Decommission Plan.
  - (2) Update the ICD(s).
  - (3) Prepare and submit the DR to the SE DA, validating the successful completion of the Decommissioning Plan.
- c. The SE DA concurrence on the DR serves as the transition to the Project Completion Phase.



#### **5.4.5.2 Project Completion**

- a. During Project Completion, the project team validates that all efforts to meet the goals and objectives are complete, all records are placed in a records repository accessible by the Agency OCIO and a Project Completion Review (PCR) is held to assess the project's completion.
- b. The Project Manager shall meet the following PCR success criteria by filing the following documentation in the records repository accessible by the Agency OCIO:
  - (1) Final PCR presentation charts.
  - (2) Final Enterprise Architecture Service Assessment (EASA).
  - (3) Final DR.
- c. The SE DA shall make a decision on the completion of the project.

## Appendix A. Definitions

**Acceptable Risk.** The risk that is understood and agreed to by the program/project, program/project governing body, Mission Directorate and/or Mission Support Office, and other customer(s) such that no further specific mitigating action is required. (Some mitigating actions might have already occurred.)

**Acquisition.** Obtaining, or advancing the development of, the systems, research, services, construction, and supplies to fulfill the Agency's mission and other activities which advance the Agency's statutory objectives. (The definition of acquisition in this document is used in a broader context than the FAR definition to encompass the spectrum of various NASA acquisition authorities and approaches to achieve the Agency's mission and activities).

**Action.** A discrete task that is accomplished by a single individual or a small team or group. Action items typically arise from meetings and should be clearly documented.

**Activity.** An effort that operates the IT infrastructure capabilities and systems/services. Unlike projects and initiatives, activities are ongoing and repetitive. Activities consume resources and have a sustainment cost.

**Agile.** Agile software development methodology enables an incremental release strategy. The strategy includes phasing requirements and using a framework to manage requirements, design, coding, and testing processes, based on a minimal set of activities needed to reach the end goal of delivering product that works.

**Analysis of Alternatives.** A formal analysis method that compares alternative approaches by estimating their ability to satisfy mission requirements through an effectiveness analysis and by estimating the life-cycle costs (LCC) through cost analysis. The results of these two analyses are used together to produce a cost-effectiveness comparison that allows decision makers to assess the relative value or potential program returns of the alternatives. An analysis of alternatives broadly examines multiple elements of program/project alternatives (including recommended concept, technical performance, risk, LCC, and program aspects).

**Approval.** Authorization by a required management official to proceed with a proposed course of action. Approvals are documented.

**Baseline.** An agreed-to set of requirements, cost, and schedule that will have changes controlled through a formal approval and monitoring process.

**Compliance Matrix.** The Compliance Matrix documents how the program or project complies with the requirements of this NPR. It provides rationale and approvals for relief from requirements and is part of formal program and project documentation.

**Concept of Operations (ConOps).** Developed early in Pre-Formulation, describes the overall high-level concept of how the system/service will be used to meet user expectations, usually in a time sequenced manner. It describes the system/service from an operational perspective and helps facilitate an understanding of the system/service goals. It stimulates the development of the requirements and architecture related to the user elements of the

system/service. It serves as the basis for subsequent definition documents and provides the foundation for the long-range user operational expectations.

**Contract.** A mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing. In addition to bilateral instruments, contracts include (but are not limited to) awards and notices of awards; job orders or task letters issued under basic ordering agreements; letter contracts; orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; and bilateral contract modifications. Contracts do not include grants and cooperative agreements.

**Customer.** Any individual, organization, or other entity to which a program or project provides a product(s) and/or service(s).

**Cybersecurity.** Protection of people, property, and information assets owned by NASA that covers physical assets, personnel, IT, communications, and operations.

**Decision Authority.** The individual authorized by the Agency to make decisions on programs and projects under their authority.

**Decision Memorandum.** The document that summarizes the decisions made at life-cycle reviews or in between reviews following the approved OCIO template.

**Decommission.** The process of removing a system/service from operations.

**Deployment.** The life-cycle phase that culminates with the transfer of responsibility for the system/service from the project team to an operations and maintenance engineering team. At the conclusion of the deployment, the system/service is considered fully operational.

**Development, Modernization, and Enhancement.** DME of an IT system/service may include IT investments for steady state. DME includes design, development, testing, and deployment of changes and enhancements to existing systems/services to engender new or modified functionality. DME may also include development, consolidation, integration, and/or expansion of systems/services to support other Agency needs.

**Disposal.** The process of eliminating a project's assets.

**Dissenting Opinion.** A disagreement with a decision or action that is based on a sound rationale (not on unyielding opposition) that an individual judges is of sufficient importance that it warrants a specific review and decision by higher-level management, and the individual specifically requests that the dissent be recorded and resolved by the Dissenting Opinion process.

**Enterprise Architecture.** Use of a common framework and methodology to describe the integrated Target capability/service environment (including components such as people, systems, processes, information/data, and their inter-relationships) and the transition plan that integrates the IT program architectures for the purpose of describing the integrated delivery of services.

**Enterprise Architecture Project Assessment.** The process used to validate alignment and integration of the project with the program architecture.

**Enterprise Architecture Service Assessment.** The process used to validate the resulting system/service operates in alignment with the program architecture.

**Evaluation.** The continual self and independent assessment of the performance of a program or project and incorporation of the evaluation findings to ensure adequacy of planning and execution according to plans.

**Formulation.** The identification of how the program or project supports the Agency's strategic goals; the assessment of feasibility, technology, and concepts; risk assessment, team building, development of Concept of Operations, and acquisition strategies; establishment of high-level requirements and success criteria; the preparation of plans, budgets, and schedules essential to the success of a program or project; and the establishment of control systems to ensure performance to those plans and alignment with current Agency strategies.

**Formulation Authorization Document.** The document approved by the DA to authorize the formulation of a program or project whose goals will fulfill part of the Agency's IT Strategic Plan and formulate a program or project plan.

**Governing Body.** The board that has responsibility for the oversight of programs and projects, conducting reviews, and making recommendations to the Decision Authority on the program or project readiness to transition to the next phase of the program or project life cycle.

**Implementation.** The execution of approved plans for the development and operation of the program/project, and the use of control systems to ensure performance to approved plans and continued alignment with the Agency's goals.

**Incremental Development.** The incremental build model is a method of software development where the product is designed, implemented, and tested incrementally (a little more is added each time) until the product is finished. It involves both development and maintenance. The product is defined as finished when it satisfies all of its requirements.

**Independent Assessment.** The process that includes reviews, evaluations, audits, analysis oversight, and investigations. Assessments are independent to the extent the involved personnel apply their expertise impartially and without any conflict of interest or inappropriate interference or influence, particularly from the organization(s) being assessed.

**Information System.** A discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information.

**Information Technology.** Any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by an executive Agency. IT also includes computers, ancillary equipment (including imaging peripherals, input, output, and storage devices necessary for security and surveillance), peripheral equipment designed to be controlled by the central processing unit of a computer; software; firmware; and similar procedures, services (including support services), and related resources, but does not include any equipment acquired by a Federal contractor incidental to a Federal contract.

**Initiative.** An effort intended to achieve stated objectives, such as improving performance, reducing costs, or analyzing capabilities. An initiative does not yield a new or revised system/service. Initiatives consume resources and may have associated cost. An initiative has a beginning date and end date, but has no required reviews.

**Interface Control Document.** Establishes and defines the detailed interface between two or more systems, end products, system elements, or configuration items. It is developed to control the defined interface early in the life cycle to reduce design changes due to poorly identified, managed, or controlled interfaces and is modified to reflect the system decommissioning.

**Investment.** Resources, usually funding, along with a decision on how to apply those resources that results in a capability, product, or service that helps NASA achieve its Mission. Generally, the benefits of an investment exceed the cost of the investment.

**IT Authority.** Refers to portfolio investment insight and oversight, EA compliance, and cybersecurity compliance. The NASA CIO's IT Authority is to provide governance and processes that enable the CIO to have insight and influence on all IT investments.

**IT Program.** A program identified by the NASA CIO that delivers a complex set of IT developmental, enhancement, and operational services and capabilities to manage the implementation of the NASA IT Strategic Plan.

**IT Program Authority.** Refers to the oversight, implementation, and operations of IT services that are delivered by the NASA CIO or delegate. NASA CIO program authority applies to all IT investments.

**Key Decision Point.** The event at which the DA determines the readiness of a program/project to progress to the next phase of the life cycle (or to the next KDP).

**Lessons Learned.** The significant knowledge or understanding gained through past or current programs and projects that is documented and collected to benefit current and future programs and projects.

**Life-Cycle Cost.** The total of the direct, indirect, recurring, nonrecurring, and other related expenses both incurred and estimated to be incurred in the design, development, verification, production, deployment, operation, maintenance, support, closeout, and disposal of a program/project.

**Major IT Investment.** A system or acquisition requiring special management attention because of its importance to the mission or function of the Agency, a component of the Agency, or another organization; is for financial management and obligates more than \$20M annually; has significant program or policy implications; has high executive visibility; has high development, operating, or maintenance costs; is funded through other than direct appropriations; or is defined as major by the Agency's capital planning and investment control process.

**Mission Directorate.** A primary implementer of a NASA mission area. Each Mission Directorate is led by an Associate Administrator who leads their respective mission area. Listed in the order they appear on the NASA organizational chart, the current Mission Directorates are as follows: Aeronautics, Human Exploration and Operations, and Science.

**Mission Support Office.** Headquarters organizations that establish and disseminate policy and leadership strategies within assigned areas of responsibility in support of all NASA programs and activities. Refer to NPD 1000.3 for the list of offices included in this designation. As used in this document, the term refers to any Headquarters non-Mission Directorate office that initiates a program or project.

**Operations.** The management of IT system/services to provide high quality, cost effective capabilities.

**Operations Concept (OpsCon).** Developed over the life cycle, a detailed description of the operational boundaries, incident and performance/capacity monitoring systems and procedures, security controls, and related procedures for transition from development to operations for the Maintenance Phase.

**Pilot.** A full-feature system deployed into the production environment as an experimental trial to a limited user base, with all relevant IT system security controls in place, including an Authorization to Operate (ATO).

**Plan of Action and Milestones.** A corrective action plan for tracking and planning the resolution of information cybersecurity weaknesses. It details resources required to accomplish the elements of the plan, any milestones in meeting the tasks, and scheduled completion dates for the milestones.

**Pre-Formulation.** The study of a broad range of system/service-enabling concepts that align to the program objectives and the identification of project structures, governance tailoring, and estimated funding requirements. This phase may include a Technology Development (TD) effort.

**Preliminary.** In the context of this document, preliminary implies that the product has received initial review in accordance with Center best practices. The content is considered correct, though some to be determined items may remain. All approvals required by Center policies and procedures have been obtained. Major changes are expected.

**Procedural Requirement.** Requirements levied on a lower organizational level by a higher organizational level.

**Program.** A strategic investment that has a defined architecture and/or technical approach, requirements, funding level, and management structure that initiates and directs one or more projects. A program may have interfaces to other programs, agencies, and international partners. A program defines a strategic direction that the Agency has identified as critical.

**Program Architecture.** Use of a common framework and methodology to describe the target capability/service environment (including components such as people, systems, processes, information/data, and their inter-relationships) for a particular IT program (as a segment of the EA) and the transition plan to move the current state to that target. Program architecture includes enterprise and Center instances of program capabilities.

**Program Commitment Agreement.** An agreement between the NASA CIO and the Program Executive to provide funding commitment for instantiation of the program.

**Program Plan.** An agreement between the NASA CIO and the Program Manager that establishes the program's baseline, management controls, goals, objectives, and risks. The Program Plan is updated and approved throughout the program life cycle.

**Program (Project) Team.** All participants in program (project) life-cycle phases. This includes all direct reports and others that support meeting program/project responsibilities.

**Project.** An IT project is a specific investment identified in a Program Plan having defined requirements, a LCC, a beginning, and an end. A project has a management structure and is planned, executed, and controlled according to a formal methodology and governed through a defined series of life-cycle reviews. An IT project may have interfaces to other projects, agencies, and international partners. A project yields a new or revised system/service that directly addresses NASA's strategic goals.

**Project Plan.** The document that establishes the project's baseline for implementation, signed by the responsible Program Manager, Center Director, Project Manager, and the Mission Directorate Associate Administrator, if required.

**Proof of Concept.** An analytical and experimental demonstration of hardware/software concepts that may or may not be incorporated into subsequent development and/or operational units. The Proof of Concept (PoC) should clearly state what it is to be proven and to what degree.

**Prototype.** A prototype is used to test the viability or usefulness of a system or subsystem and demonstrates the technology in a way that the customer or beneficiary can visualize the experience of using the technology or system. It is intended to identify, demonstrate, and evaluate the key management, policy, technology, and cost implications of a desired system. A prototype is intended for a fixed and limited duration to capture lessons or knowledge for possible implementation. It operates within a test environment and is not a full-feature system.

**Rebaseline.** A change to a program or project's approved requirements, schedule, budget, or a combination of all three factors that are to be controlled through a formal approval and monitoring process.

**Request for Action.** A type of comment form that reviewers submit during life-cycle reviews to capture their comments, concerns, and/or issues.

**Requirements Specification.** The document that specifies the agreed-upon user, functional, non-functional, security, system interface, regulatory, and performance requirements for the system/software product development and includes a sound process for the allocation and control of requirements throughout all levels.

**Requirements Traceability Matrix.** The traceability of the requirements through the RS, DS, and Test Plan and Procedures to ensure they remain traceable and verifiable through the development life cycle.

**Review Item Discrepancy.** A type of comment form that reviewers submit during life-cycle reviews to capture their comments, concerns, and/or issues.

**Risk.** The combination of the probability that a program or project will experience an undesired event (some examples include a cost overrun, schedule slippage, malicious activities, or failure to achieve a needed technological breakthrough or success criteria) and the consequences, impact, or severity of the undesired event, were it to occur. Both the probability and consequences may have associated uncertainties.

**Risk Assessment.** An evaluation of a risk item that determines:

- what can go wrong.
- how likely is it to occur.

- what the consequences are.
- what the uncertainties are that are associated with the likelihood and consequences, and
- what the mitigation plans are.

**Service.** The application of business and technical expertise to enable organizations in the creation, management, and optimization of; or access to; information and business processes.

**Stakeholder.** An individual or organizational customer having an interest (or stake) in the outcome or deliverable of a program or project.

**Success Criteria.** Specific accomplishments that need to be satisfactorily demonstrated to meet the objectives of a life-cycle review so that a program/project can progress further in the life cycle.

**System.** The combination of elements that function together to produce the capability required to meet a need. The elements include all hardware, software, equipment, facilities, personnel, processes, and procedures needed for this purpose.

**System Architecture.** Focuses on structure in systems and system elements. System architecture addresses the architectural principles, standards concepts, properties, and characteristics of the system-of-interest. System architecture could include: platform services and logical/physical technology components; applications as groups of capabilities that provide key business functions and manage the data assets; enterprise's major types and sources of data, logical data assets, physical data assets, and data management resources.

**Systems Engineering.** A disciplined approach for the definition, implementation, integration, and operation of a system (product or service). The emphasis is on achieving stakeholder functional, physical, and operational performance requirements in the intended use environments over planned life within cost and schedule constraints. Systems engineering includes the engineering processes and technical management processes that consider the interface relationships across all elements of the system, other systems, or as a part of a larger system.

**Systems Engineering Review.** Serves as a measure of a project's progress towards identified project goals/objectives and maturity of project work products.

**Tailoring.** The process used to scale the prescribed requirements to accommodate the needs of a program or project. The tailoring process results in the completion of the Compliance Matrix, found in Appendix C of this NPR.

**Technology Development.** IT Technology Development matures a particular technology or set of related technologies and is managed within the project life cycle (Pre-Formulation), to the point where it is ready to transition to the IT project Formulation Phase.

**Termination Review.** A review initiated by the DA for the purpose of securing a recommendation as to whether to continue or terminate a program or project. Failing to stay within the parameters or levels specified in controlling documents will result in consideration of a Termination Review.

**Test Plan.** Documentation that demonstrates the traceability of test cases/scenarios to requirements and design (verification) and describes user acceptance testing (validation).



**Validation.** The process of showing proof that the product accomplishes the intended purpose based on user/top-level requirements. May be determined by a combination of test, analysis, demonstration, and inspection.

**Verification.** Proof of compliance with and traceability to system requirements. Verification may be determined by a combination of test, analysis, demonstration, and inspection. Answers the question, “Did I build the product right?”

**Waiver.** A documented authorization releasing a program or project from meeting a requirement after the requirement is put under configuration control.

## Appendix B. Acronyms

AO	Authorizing Official
AoA	Analysis of Alternatives
ATO	Authorization to Operate
CDR	Critical Design Review
CIO	Chief Information Officer
ConOps	Concept of Operations
CR	Closeout Report
DA	Decision Authority
DME	Development, Modernization, and Enhancement
DR	Decommissioning Review
DRR	Decommissioning Readiness Review
DS	Design Specification
EA	Enterprise Architecture
EAPA	Enterprise Architecture Project Assessment
EASA	Enterprise Architecture Service Assessment
FAC-P/PM	Federal Acquisition Certification for Program and Project Managers
FAD	Formulation Authorization Document
FAR	Federal Acquisition Regulation (including NASA FAR Supplement 1834.2)
FFRDC	Federally Funded Research and Development Center
FIPS	Federal Information Processing Standard (FIPS 199)
FISMA	Federal Information Security Modernization Act
FITARA	Federal Information Technology Acquisition Reform Act
GAO	Government Accountability Office
HBK	Handbook
IA	Independent Assessment
ICD	Interface Control Document
IT	Information Technology
JPL	Jet Propulsion Laboratory
KDP	Key Decision Point

NASA	National Aeronautics and Space Administration
NID	NASA Interim Directive
NIST	National Institute of Standards and Technology
NODIS	NASA Online Directives Information System
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
O&M	Operations and Maintenance
OCIO	Office of the Chief Information Officer
OFPP	Office of Federal Procurement Policy
OMB	Office of Management and Budget
OpsCon	Operations Concept
ORR	Operational Readiness Review
PCA	Program Commitment Agreement
PCDR	Program Concept and Definition Review
PCR	Project Completion Review
PDR	Preliminary Design Review
PE	Program Executive
PMO	Program/Project Management Office
POA&M	Plan of Action and Milestones
PoC	Proof of Concept
PP&E	Property, Plant, and Equipment
PRA	Paperwork Reduction Act
RFA	Request for Action
RID	Review Item Discrepancy
RS	Requirements Specification
RTM	Requirements Traceability Matrix
SAR	Security Assessment Report
SE	Systems Engineering
SERT	Systems Engineering Review Team
SP	Special Publication
SR	Status Review
SRR	System Requirements Review
TD	Technology Development

TDF	KDP-TD Formulation
TDI	KDP-TD Implementation
TDT	KDP-TD Transition
TRR	Test Readiness Review

## Appendix C. Compliance Matrices

C.1 The Compliance Matrix provides a list of requirements to document program and project compliance with this NPR.

C.2 The tailoring for requirements is documented in the Compliance Matrix.

C.3 Program or Project Managers attach this Compliance Matrix to the Formulation Authorization Document.

C.4 Once the FAD is signed and the Compliance Matrix has been briefed and approved by the DA, the tailoring is considered approved.

C.5 If updates to the matrix are needed after FAD approval, then the Project Manager includes the updates in the Project Plan for approval at a KDP or rebaseline review.

C.6 The Compliance Matrix is completed in accordance with these instructions. The matrix lists the following:

C.6.1 NPR 7120.7 requirement statement.

C.6.2 Product state.

C.6.3 NPR 7120.7 paragraph reference.

C.6.4 “Compliance?” column to describe the level of compliance and identify the approach to the requirement.

C.6.4.1 “C” for Comply – requirement is met without tailoring and within the specified phase.

C.6.4.2 “PC” for Partially Comply – requirement is partially met within the annotated phase; requirement is partially met outside the annotated phase; or requirement is fully met outside of the annotated phase.

C.6.4.3 “NC” for Not Comply – requirement will not be met.

C.6.4.4 “NA” for Not Applicable – requirement does not apply.

C.6.5 “Justification” column to describe the rationale for tailoring, why and how the requirement will be tailored, or justifies why the requirement is not applicable.

C.6.5.1 It is expected that much of the rationale listed as justification will already have been developed in retrievable program and/or project records (e.g., FAD or other documentation) and can be referenced easily.

C.6.5.2 In the case where evaluation of the justification indicates that the tailoring of a requirement increases risk, the risk will be carried in program or project risk register.

## C.7 IT Policy Requirements

**Table C-1, IT Program and Project Policy Requirements**

IT Program and Project Management Policy Requirements				
#	Mandatory Action	Req. Para #	Compliance? (C/ PC/NC /NA)	Justification
1	Internal Controls, NPD 1200.0	P.5a		Delete
2	Internal and External Controls, NPD 1210.2	P.5a		Delete
3	OCIO Standard Templates (or equivalent)	3.3a(3)		
4	Decision Memorandum to document results and decisions	3.3a(5)		
5	Records repository accessible by the Agency OCIO	3.3a(6)		
6	NASA Enterprise Architecture Procedures, NPR 2830.1	3.4		
7	NASA Information Security Policy, NPD 2810.1	3.5		
8	Security of Information Technology, NPR 2810.1	3.5		
9	Guide for mapping types of Information and Information Systems to Security Categories, NIST Special Publication (SP) 800-60	3.5		
10	Systems Security Engineering, NIST SP 800-160	3.5		
11	Records Management: NPD 1440.6 and NPR 1441.1	3.6		
12	Privacy: NPR 1382.1	3.7		
13	Paperwork Reduction Act: NID 1417.102	3.8		
14	Risk Management: NPR 8000.4	3.9		
15	Capital Asset Identification and Treatment, NPD 9250.1	3.10		
16	Termination Review	3.12a		
17	Dissenting Opinions	3.13a		
18	Software Development, NPR 7150.2	5.2a		

## C.8 IT Program Requirements

**Table C-2, IT Program: Formulation Phase (Phase 0)**

Program Formulation Phase (Phase 0)					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification
1	Program FAD	Final	3.1, 3.10, 4.2b, 4.4.1a(1)		
2	PCA	Final	3.10, 4.2b, 4.4.1a(2)		
3	Program Plan	Preliminary	3.10, 4.2b, 4.4.1c(1)		
4	Compliance Matrix	Preliminary	3.2c, 3.2d, 3.2e, 3.3a, 3.3b, 4.4.1c(4)		
5	PCDR Presentation	Final	4.2b, 4.4.1c(5)		
6	Conduct PCDR	Final	4.4.1d		
	KDP-I				
8	Conduct IA	Final	3.11b, 4.2b, 4.4.1d(1)		
9	IA Presentation	Final	4.4.1d(2)		
10	Program Plan	Final	4.2b, 4.4d(2), 4.4.1a(3), 4.4.1f(1)(a)		
11	Compliance Matrix	Final	4.4.1f(1)(b)		
12	KDP-1 Presentation	Final	4.4.1f(1)(c)		
13	Program Board Charter	Final	4.2b, 4.4.1a(4), 4.4.1f(1)(d)		
14	Conduct KDP-1	Final	4.2b, 4.3c, 4.4.1f(1)(e), 4.4.1f(2),		

**Table C-3, IT Program: Implementation/Operations Phase (Phase 1-n)**

Program Implementation/Operations Phase (Phase 1-n)					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/ PC/NC/NA)	Justification
Phase 1-n					
1	Conduct IA	Final	3.11b, 4.2b, 4.4.2d		

2	IA Presentation	Final	4.4.2e		
3	Program Plan	Update	4.2b, 4.3.1b, 4.3.1c, 4.3.1e, 4.3.2c, 4.4.d(1), 4.4.d(2), 4.4.2g(1)		
4	Compliance Matrix	Update	4.4.2g(2)		
5	Program Board Charter	Update	4.2b, 4.4.2g(3)		
6	KDP-n Presentation	Final	4.4.2g(4)		
7	Conduct KDP-n	Final	4.2b, 4.4.2g		
Phase n: If final phase of Program					
8	Termination Review Presentation	Final	3.12g		
9	Conduct Termination Review	Final	3.12h, 4.2b, 3.12a		

## C.9 IT Project Requirements

**Table C-4, IT Pre-Formulation Phase**

Concept Studies					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification
<b>Concept Studies: TD Formulation</b>					
1	TD FAD	Final	3.10, 5.4.1.1.1b(1)		
2	Compliance Matrix	Final	3.2c, 3.2d, 3.2e, 5.4.1.1.1b(2)		
3	KDP-TD Formulation Presentation	Final	5.4.1.1.1b(3)		
4	TD Project Plan	Preliminary	3.10, 5.4.1.1.1b(4)		
5	Conduct TD Formulation Review	Final	5.4.1.1.1c, 5.4.1.1.1d		
6	TD Project Plan	Final	5.4.1.1.1e(1)		
7	KDP-TD Implementation Presentation	Final	5.4.1.1.1e(2)		
8	Compliance Matrix	Update	5.4.1.1.1e(3)		
9	Conduct KDP-TD Implementation	Final	5.4.1.1.1f		
<b>Concept Studies: TD Implementation</b>					



1	Conduct Status Reviews (A-n)	Final	5.4.1.1.2a(1)		
2	TD Plan	Final	5.4.1.1.3a(1)(a)		
3	KDP-TD Transition Presentation	Final	5.4.1.1.3a(1)(b)		
4	TD Business Case	Final	5.4.1.1.3a(1)(c)		
5	Compliance Matrix	Update	5.4.1.1.3a(1)(d)		
6	Conduct KDP-TD Transition	Final	5.4.1.1.3a(2)		
<b>Concept Studies: TD Transition</b>					
1	TD Closeout Report	Final	5.4.1.1.3a(4), 5.4.1.1.3a(4)(a)		
2	Project FAD	Final	3.1, 3.10, 5.2c, 5.2e, 5.4.1.1.3a(3) /5.4.1.2b(1), 5.4e		
3	Compliance Matrix	Final	3.2c, 3.2d, 3.2e, 3.3a, 3.3b, 5.4.1.1.3a(3) /5.4.1.2b(2)		
4	SERT Designation Form	Final	5.4.1.2b(4)		
5	KDP-Formulation presentation	Final	5.4.f(2), 5.4.1.2b(3)		
6	Conduct KDP-Formulation Review	Final	5.4.1.2c, 5.4.f(2)		

**Table C-5, IT Formulation Phase**

<b>Concept &amp; Requirements</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification / Comments
<b>SRR</b>					
1	Requirements Specification	Final	5.4.2.1c(1)		
2	Requirements Traceability Matrix	Preliminary	5.4.2.1c(2)		
3	SRR Presentation	Final	5.4.2.1c(3)		
4	Enterprise Architecture Project Assessments (EAPA)	Final	3.4, 5.4.2.1c(4)		
5	Project Plan	Preliminary	3.10, 5.4.2.1c(5)		
6	IT System Security Plan	Preliminary	3.5, 5.4.2.1c(6)		
7	Software Development/	Preliminary	5.4.2.1c(7)		

	Management Plan				
8	Concept of Operations	Preliminary	5.4.2.1c(8)		
9	Analysis of Alternatives (AoA)	Preliminary	5.4.2.1c(9)		
10	Conduct SRR	Final	2.2.2b, 5.4.2.1d		
<b>Preliminary Design</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/ PC/NC /NA)	Justification / Comments
<b>PDR</b>					
1	Conduct IA	Final	3.11c, 5.4.4.2c(1)(2)(3)(4)		
2	IA Support	Final	5.4.2.2.d		
3	AoA	Final	5.4.2.2c(1)		
4	Design Specification (DS)	Preliminary	5.4.2.2c(2)		
5	Requirements Traceability Matrix	Update	5.4.2.2c(3)		
6	Interface Control Documents	Preliminary	5.4.2.2c(4)		
7	Acquisition Plan	Final	5.4.2.2c(5)		
8	Software Development/ Management Plan	Update	5.4.2.2c(6)		
9	Project Plan	Update	5.4.2.2c(7)		
10	IT System Security Plan	Update	3.5, 5.4.2.2c(8)		
11	Concept of Operations (ConOps)	Update	5.4.2.2c(9)		
12	Operations Concept (OpsCon)	Preliminary	5.4.2.2c (10)		
13	Test Plan	Preliminary	5.4.2.2c(11)		
14	Security Control Assessment	Preliminary	3.5, 5.4.2.2c(12)		
15	PDR Presentation	Final	5.4.2.2c(13)		
16	Conduct PDR	Final	2.2.2b, 5.4.2.2d		
17	IA Report (as part of KDP-Implementation)	Final	3.11c, 5.4.2.3c		
<b>KDP-Implementation</b>					
1	KDP-Implementation Presentation	Final	5.4.2.3b, 5.4.2.3b(1)		
2	Conduct KDP-Implementation	Final	5.3b, 5.4f(2), 5.4.2.3d		
3	Project Plan	Update	5.4.2.3b, 5.4.2.3b(2)		

**Table C-6, IT Implementation Phase**

<b>Final Design &amp; Build</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC / NC/NA)	Justification
<b>CDR</b>					
1	Design Specification (DS)	Final	5.4.3.1c(1)		
2	Requirements Traceability Matrix (RTM)	Update	5.4.3.1c(2)		
3	Project Plan	Update	5.3.1b, 5.3.1d, 5.3.2b, 5.4e, 5.4.3.1c(3)		
4	Interface Control Documents	Update	5.4.3.1c(4)		
5	Test Plan	Update	5.4.3.1c(5)		
6	Test Cases and Procedures	Preliminary	5.4.3.1c(6)		
7	O&M Sustainment Commitments	Preliminary	5.4.3.1c(7)		
8	O&M Handbook	Preliminary	5.4.3.1c(8)		
9	Software Development/ Management Plan	Final	5.4.3.1c(9)		
10	Project Training Plan and Materials	Preliminary	5.4.3.1c(10)		
11	IT System Security Plan	Update	3.5, 5.4.3.1c(11)		
12	Concept of Operations	Final	5.4.3.1c(12)		
13	Operations Concept	Update	5.4.3.1c(13)		
14	Security Control Assessment	Final	3.5, 5.4.3.1c(14)		
15	CDR Presentation	Final	5.4.3.1c(15)		
16	Acquisitions	Final	5.4.3.1d		
17	Conduct CDR	Final	2.2.2b, 5.4.3.1e		
<b>System Assembly &amp; Integration</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC /NA)	Justification
<b>TRR</b>					
1	Test Plan	Final	5.4.3.2c(1)		
2	Requirements Traceability Matrix	Final	5.4.3.2c(2)		

	(RTM)				
3	Project Training Plan and Materials	Final	5.4.3.2c(3)		
4	O&M Handbook	Update	5.4.3.2c(4)		
5	Project Plan	Update	5.3.1b, 5.3.1d, 5.3.2b, 5.4.3.2c(5)		
6	Security Assessment Report (SAR)	Final	3.5, 5.4.3.2c(6)		
7	Authorization Package	Preliminary	5.4.3.2c(7)		
8	Operations Concept (OpsCon)	Update	5.4.3.2c(8)		
9	Authority to Operate (ATO)	Final*	5.4e, 5.4.3.2c(9)		
10	TRR Presentation	Final	5.4.3.2c(10)		
11	Conduct TRR	Final	2.2.2b, 5.4.3.2e		
12	Subsystem and System Integration and Testing	Final	5.4.2.3d		
<b>Test &amp; Pre-Deployment</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification
<b>ORR</b>					
1	Project Plan	Update	5.3.1b, 5.3.1d, 5.3.2b, 5.4.3.3c(1)		
2	Deployment Plan	Final	5.4.3.3c(1), 5.4.4.1b(2)		
3	Plan of Action and Milestones (POA&M)	Final	3.5, 5.4.3.3c(1)		
4	O&M Sustainment Commitments	Final	5.4.3.3c(1)		
5	Authority to Operate (ATO)	Update	3.5, 5.4.3.3c(1)		
6	IT System Security Plan	Final	3.5, 5.4.3.3c(1)		
7	Operations Concept	Final	5.4.3.3c(1)		
8	O&M Handbook	Final	5.4.3.3c(1)		
9	ORR Presentation	Final	5.4.3.3c(1)		
10	Conduct ORR	Final	2.2.2b		
<b>KDP-Operations</b>					
1	KDP-Operations Presentation	Final	5.4.3.4b(1)		

2	Authority to Operate	Final	3.5, 5.4e, 5.4.3.4b(2)		
3	Conduct KDP-Operations	Final	5.3.1c, 5.4.3.4c, 5.4.4.1c		

\*If testing is to be conducted in the production environment, then the ATO is to be final before the start of testing.

**Table C-7, IT Operations Phase**

<b>Deployment / Operations &amp; Maintenance</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification
<b>DRR</b>					
1	ICD	Update	5.4.4.2c(1)		
2	Decommission Plan	Final	P.5e, 4.1.3b, 5.4.4.2c(2)		
3	DRR Presentation	Final	5.4.4.2c(3)		
4	Conduct DRR	Final	2.2.2b, 5.4.4.2d		
<b>KDP-Decommission</b>					
1	KDP-Decommission Presentation	Final	4.1.3b, 5.4.4.3b(1)		
2	Conduct KDP-Decommission	Final	5.4.4.3c		

**Table C-8, IT Decommission Phase**

<b>Decommissioning</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification
1	Interface Control Document	Update	5.4.5.1b(2)		
2	Decommission Report	Final	4.1.3.b, 5.4e, 5.4.5.1b(3)		
<b>Project Completion</b>					
#	Mandatory Action	Product State	Req Para #	Compliance? (C/PC/NC/NA)	Justification
<b>PCR</b>					
1	PCR Presentation	Final	5.4.5.2b(1)		
2	EASA	Final	3.4, 5.4.5.2b(2)		
3	Decommission Report	Final	P.5e, 4.1.3b, 5.4e, 5.4.5.2b(3)		

4	Conduct PCR	Final	2.2.2b, 5.4.5.2c		
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## Appendix D. IT Program and Project Gate Products

Key: P=Preliminary, F=Final, U=Updated

### D.1 IT Program Gate Products

Table D-1, IT Program Gate Products

NPR 7120.7 Program Gate Products			
	Phase 0	Phase 1-n	Phase n
Mandatory Action	Formulation	Implementation/Operations	
Program FAD	F		
Program PCA	F		
Program Plan	P	U	U
Compliance Matrix	P	U	
PCDR Presentation	F		
Conduct PCDR	F		
Conduct NAR	F	F	
NAR Presentation	F	F	
KDP-I Presentation	F		
Program Board Charter	F	U	U
Conduct KDP-1	F		
Conduct KDP-2-n		F	
Termination Review Presentation			F
Conduct Termination Review			F

## D.2 Pre-Formulation into Formulation Gate Products

**Table D-2, Pre-Formulation**

IT Life Cycle Phases	Pre-Formulation				Formulation
IT Project Life Cycle Phases	Concept Studies				Concept & Requirements
	TD Formulation		TD Implementation	TD Transition	
Mandatory Action	TD Formulation	TDP-Formulation	TDP-Implementation	TDP-Transition	KDP-Formulation
TD FAD	F				
Compliance Matrix	F	U			U
KDP-TD Formulation Presentation	F				
TD Project Plan	P				
Conduct TD Formulation Review	F				
TD Project Plan		F		F	
KDP-TD Implementation Presentation		F			
Conduct KDP-TD Implementation		F			
Conduct Status Reviews (A-n)			F		
TD Business Case			P	F	
Conduct KDP-TD Transition				F	
Project FAD				F	
Compliance Matrix				F	
SERT Membership Designation Form				F	
TD Closeout Report				F	
KDP-Formulation presentation					F
Conduct KDP-Formulation review					F



## D.3 IT Project Gate Products

**Table D-3, IT Project Gate Products**

IT Life Cycle Phases	Pre-Formulation	Formulation			Implementation				Operations		Decommission	
IT Project Life Cycle Phases	Concept Studies	Concept & Requirements	Preliminary Design		Final Design & Build	System Assembly & Integration	Test & Pre Deployment		Deployment / Operations & Maintenance		Decommissioning	Project Completion
Mandatory Action	KDP-Formulation	SRR	PDR	KDP-Implementation	CDR	TRR	ORR	KDP-OPS	DRR	KDP-Decommission	PCR	
Requirements Specification		F										
Requirements Traceability Matrix		P	U		U	F						
SRR Presentation		F										
Enterprise Architecture Project Assessments (EAPA)		F										
Project Plan		P	U	U	U	U	U					
IT System Security Plan[		P	U		U		F					
Software Development/Management Plan		P	U		F							
Concept of Operations		P	U		F							
Analysis of Alternatives (AoA)		P	F									
Conduct IA			F									
IA Support			F									
AoA			F									
Design Specification (DS)			P		F							
Interface Control Document (ICD)			P		U				U		U	
Acquisition Plan			F									
Operations Concept			P		U	U	F					
Test Plan			P		U	F						
Security Control Assessment			P		F							
PDR Presentation			F									
Conduct PDR			F									
IA Report (presented at KDP-I)			F									
KDP-Implementation Presentation				F								
Conduct KDP-Implementation				F								
Test Cases and Procedures					P	F						
O&M Sustainment Commitments					P		F					
O&M Handbook					P		F					
Project Training Plan and Materials					P	F						
CDR Presentation					F							
Acquisitions					F							

IT Life Cycle Phases	Pre-Formulation	Formulation			Implementation			Operations		Decommission		
IT Project Life Cycle Phases	Concept Studies	Concept & Requirements	Preliminary Design		Final Design & Build	System Assembly & Integration	Test & Pre Deployment		Deployment / Operations & Maintenance		Decom-missioning	Project Completion
Mandatory Action	KDP-Formulation	SRR	PDR	KDP-Implementation	CDR	TRR	ORR	KDP-OPS	DRR	KDP-Decommission	PCR	
Conduct CDR					F							
Project Training Plan and Materials						F						
Security Assessment Report (SAR)						F						
Authorization Package						P						
Authority to Operate*						F*	U	F				
TRR Presentation						F						
Conduct TRR						F						
Subsystem and System Integration and Testing						F						
Deployment Plan							F					
Plan of Action and Milestones (POA&M)							F					
ORR Presentation							F					
Conduct ORR							F					
KDP-Operations Presentation								F				
Conduct KDP-Operations								F				
Decommission Plan									F			
DRR Presentation									F			
Conduct DRR									F			
KDP-Decommission Presentation										F		
Conduct KDP-Decommission										F		
Decommission Report											F	
PCR Presentation											F	
EASA											F	
Conduct PCR											F	

*Note: \*If Pre-Formulation includes TD refer to TD Gate products matrix - requirements listed for Pre-Formulation should still be addressed in the Compliance Matrix.*



## Appendix E. References

- a. Government Accountability Office (GAO) 18-148, Information Technology Reform: Agencies Need to Improve Certification of Incremental Development.
- b. Federal Information Processing Standards (FIPS) 199, Federal Information Processing Standard for Security Categorization of Federal Information and Information Systems.
- c. Office of Federal Procurement Policy (OFPP) Memorandum, Revisions to the Federal Acquisition Certification for Program and Project Managers (FAC-P/PM), December 2013.
- d. NPD 1000.0, NASA Governance and Strategic Management Handbook.
- e. NPD 2800.1, Managing Information Technology.
- f. NPD 7120.6, Knowledge Policy on Programs and Projects.
- g. NPR 1400.1, NASA Directives and Charters Procedural Requirements.
- h. NPR 2800.1, Managing Information Technology.
- i. NPR 2841.1, Identity, Credential and Access Management.
- j. NPR 7120.5, NASA Space Flight Program and Project Management Requirements.
- k. NASA/SP-2014-3076, NASA Standing Review Board Handbook.